Wednesday Afternoon, June 5.

A LANTERN Exhibition of Photo-micrographs of Nervous Histology; Golgi Stains, was given by Dr. M. ALLEN STARR, of New York.

A LANTERN Exhibition of the Medulla Oblongata of a Chimpanzee, with other specimens, was given by Dr. EDWARD WYLLYS TAYLOR, of Boston.

EXHIBITION of the Brain of a Chimpanzee, was given by Dr. THOMAS DWIGHT, of Boston, who spoke of the brain of the chimpanzee "Jumbo," and discussed chiefly the anterior limb of the fissure of Sylvius. On the left this was distinct, ending in a bifurcation beneath a rudimentary *pars triangularis.* On the right it was represented by a minute depression not connected with the fissure.

THE PART OF INHIBITION IN THE PHYSIOLOGY OF RESPIRATION.

BY DR. WILLIAM TOWNSEND PORTER, OF BOSTON.

In comparatively recent times the theory of inhibition has been used in a new direction, to explain certain phenomena connected with respiration. The point which is particularly in question is that of spinal respiration so-called. It is known to every physiologist that when the spinal cord is cut across between the bulb and the centres for the phrenic nerve that the phrenic nerve ceases to act apparently. The respiration of the diaphragm is entirely suspended, and if the animal is not given artificial respiration death follows in a few minutes. If the animal is given artificial respiration several hours it is found that on interrupting the respiration a few moments you get movements of the diaphragm resembling movements of respiration. Upon that basis the hypothesis has been raised. It is claimed that the centre from which the impulse of respiration starts is not in the spinal bulb, but in the spinal bulb and in the spinal cord; that is, that the respiratory muscle nuclei, nuclei of the diaphragm, intercostal muscles, possess the power of sending out automatic impulses and that respiration is the result of the combined automatic action of these individual groups, and not the result of discharge of automatic impulses situated in a single bulb. That is the doctrine. Section of the spinal cord causes an inhibition of the action of the phrenic nuclei, and that this inhibition lasts such a long time that no means of keeping the animal alive suffices to bridge over this period, consequently the upholders of the doctrine assume first that the phrenic nuclei are automatic centres. They support this assumption by a second assumption that section of the spinal cord causes inhibition of these centres, and if this inhibition theory does not hold good, then the original assumption does not hold good, because they cannot then explain the uniformly fatal result of the operation. It is possible, however, to show that inhibition plays no part in the physiology of respiration, at least in the part mentioned here. The claim is that when you make section with the knife across the cord that this section causes an inhibition of these cells, the origin of the phrenic cells for so many hours that artificial respiration cannot be sufficiently prolonged to cover the whole period. The experiments which prove that this section does not cause inhibition are these. If the section is made across one-half of the spinal cord, you get in the majority of cases a standstill of the diaphragm on the same side. According to the inhibition people this standstill indicates inhibition of the nucleus of that side. If you cut the phrenic nerve during that standstill, the diaphragm on this side supposed to be inhibited begins to contract, showing that the cells were not inhibited, but merely resting. The explanation of this phenomenon is found in the fact that the respiratory impulse descends the lateral columns and is ordinarily discharged in greatest amount upon the same side. When, however, the respiratory path on that side is interrupted, the greater amount which was discharged on that side passes over to the other side, and these resting cells which previously had received but a small portion of the respiratory impulse now receive a greater respiratory impulse and get enough to begin to contract. It must follow that two hemisections while separating the cord from the bulb cannot inhibit the respiration of the phrenic nuclei. If one hemisection did not inhibit, hemisection on the other side would not inhibit its side. Hence the inhibition theory must fall to the ground. It is certain that inhibition of respiration is not caused by a section passing between phrenic nuclei and the bulb, consequently the cause of the fatal arrest of respiration following section across the spinal cord between the phrenic nuclei and the bulb cannot be inhibition, hence the only explanation left is that the phrenic nuclei no longer receiving the impulses from the bulb and cannot originate respiratory impulses. It follows then, that the respiratory centre is not situated in the spinal cord, but in the bulb.

The general application, it seems to me, is this: I have tried to point out that the present doctrine found in the text-books is that the spinal cord contains centres for such functions as micturition and defecation, etc., centres situated in the lower part of the cord, and that these centres are, according to Goltz, inhibited by a section of the cord above them. If now the inhibition is proven not to exist for respiration, then it follows with some degree of probability that Goltz's assumption is not well grounded, and on this pure assumption rests the present teaching.